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Contenu du présent numéro : *(nombres de pages: 4)*

		Pagination officielle :
OUTBREAK OF MEASLES IN A RELIGIOUS GROUP — MONTREAL, QUEBEC	F-1	1 – 4
OUTBREAK OF MEASLES AMONG CHRISTIAN SCIENCE STUDENTS — MISSOURI AND ILLINOIS, 1994	F-3	7 – 8
NOTIFIABLE DISEASES SUMMARY	F-4	5 – 6

Les références doivent renvoyer aux numéros de page de la copie imprimée et non à ceux de la copie communiquée par télécopieur.

OUTBREAK OF MEASLES IN A RELIGIOUS GROUP — MONTREAL, QUEBEC

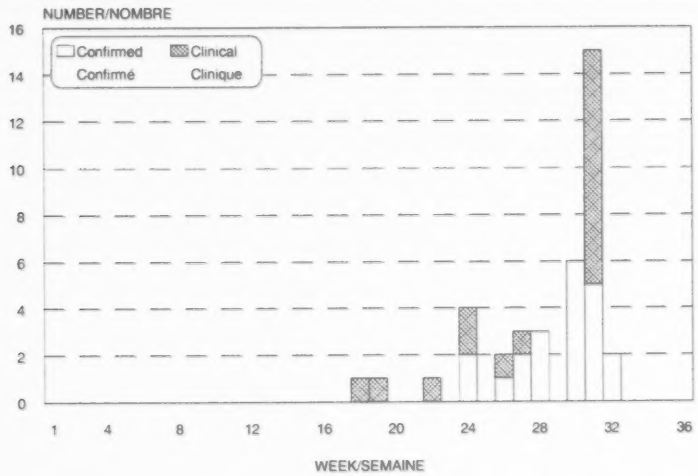
Epidemiologic information

Between 1 May and 3 September, 1994, 44 cases of measles were reported to the public health authorities of the Health and Social Services Board for the Montreal Centre Region. Distribution of cases by week of onset is shown in Figure 1. Thirty-nine of those cases met the national case definition for measles[1] and almost half (n=19) were serologically confirmed by the detection of immunoglobulin M (IgM). Since the beginning of the year, the observed incidence of measles in this region has been 3.4 cases per 100,000 person years. The overall incidence of confirmed cases in the Montreal area exceeds the total (2.4 per 100,000 person years) for all other regions in Quebec combined. The last major measles epidemic in Quebec occurred in 1989.

The cases are mainly concentrated in the north-eastern part of Montreal Island, which is located adjacent to the Lanaudière region where measles had been reported in early summer. The sex distribution of cases was equal. Almost half of the cases (n=18) were in children < 5 years of age, including one infant < 1 year old. The age distribution of other cases was as follows: 5 to 9 years (n=10), 10 to 14 (n=8), over 14 years (n=3) (Figure 2). The average age of cases was 7 years (median: 4.5 years), with a range from 8 months to 32 years. No fatalities or serious complications have been reported to date. Twenty-four (69%) of the 35 cases with known immunization status had not been immunized. Twenty-two of the 24 cases belonged to families that were members of a religious group, *la Mission de l'Esprit Saint*.

The first reported case was a teacher in a secondary school where there were no other reported cases. This case may have resulted from exposure while in the Lanaudière region where cases were being reported. Three weeks later, eight cases occurred in four families belonging to the above religious group but living in different areas. The information available

Figure 1
Number of measles cases by week of receipt of report, Montreal Centre Region, 1994 (as of 3 September)



Source: Central Registry for Reportable Diseases, *Ministère de la santé et des services sociaux* (94-09-03).

Prepared by: *Bureau de surveillance épidémiologique*, Montreal Centre Region.

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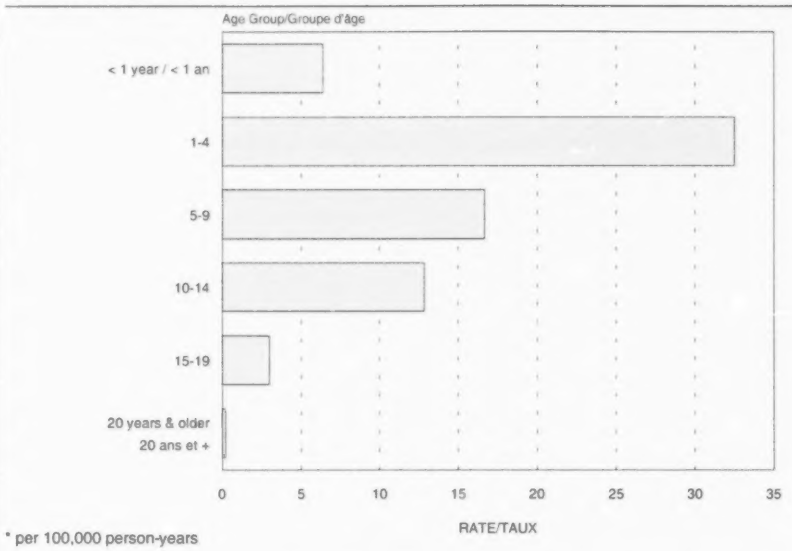
was insufficient to establish the chain of transmission.

Although eight cases developed in four schools before the end of the school year (June), no secondary cases could be identified among the school contacts. A home day care was the source of transmission for two cases; another case occurred in a counsellor in a summer camp outside Montreal where other cases had been identified in July 1994. A number of cases involved members of the same family.

Public health intervention

Each reported case was investigated to verify diagnosis and immunization status, and to identify the index case and contacts. Because of the growing number of cases, an information letter was sent to the local centres for community services (CLSC) and to all general practitioners, pediatricians and microbiologists in the region, alerting them to the epidemic situation. The letter also reminded them of the recommended control measures, and of the importance of promptly reporting and confirming all measles cases. School nurses were asked to pay particular attention to any absenteeism that occurred in the following weeks.

Figure 2
Measles incidence* by age group in Montreal Centre Region, 1994 (as of 3 September)



* per 100,000 person-years

Source: Central Registry for Reportable Diseases, *Ministère de la santé et des services sociaux* (94-09-03).

Prepared by: *Bureau de surveillance épidémiologique*, Montreal Centre Region.

Intervention with the religious group

The recurrence of certain unusual first names in a number of the measles cases made it possible to identify the religious group at the centre of this outbreak. This religious group, which was founded in Quebec early in the century, may have several thousand members, mainly throughout Quebec, but also in other Canadian provinces, and in Massachussetts and California in the United States. In Quebec, the members are mainly concentrated in the north-eastern part of Montreal Island, Laval and the Lanaudière region. According to information obtained from group members, those in Quebec appear to be divided into several independent groups, each with its own leader, and there apparently is no formal contact between these groups.

The parents contacted by telephone were cooperative in providing information on the clinical nature (signs and symptoms) of the disease in each of their sick children. Most refused immunization and immunoglobulin, but did not hesitate to cooperate in limiting the social contact of cases and susceptible contacts. A number of parents refused to identify contacts of the case(s) in their family, but the information provided by a few indicates the possibility of more than 50 additional unreported cases within this community.

After numerous attempts, the leaders of the two groups involved were identified and contacted. The situation was explained to them and they agreed to distribute an information letter to their members, but they did not agree to meet with public health officials. No further attempt has been made to convince group members to have susceptible individuals immunized.

As of 3 September, there have been no new cases of measles reported on Montreal Island.

Comments

This outbreak illustrates, once again, how quickly measles can spread in an unimmunized population. The low number of secondary cases reported outside the religious group may be explained by the following: 1) very limited contact with other children in the area; 2) the high measles vaccine coverage among school children immunized in the eastern part of Montreal Island, including those in kindergarten (> 90%); and 3) the timing of the outbreak, i.e., at the end of the school year and during summer holidays.

The implementation of the usual preventive measures to break the chain of transmission proved difficult in this group for the following reasons: 1) physicians were only consulted by parents after a considerable time had passed, or not at all; 2) reporting delays (the reporting lag time was up to 10 days); 3) refusal to disclose names of cases or potentially susceptible contacts; and 4) refusal to accept immunization and the administration of immunoglobulin, even for young infants and potentially susceptible pregnant women.

Measles outbreaks involving religious groups occurred in Illinois, Missouri, Nevada and Utah in the United States between 1 January and 10 June, 1994[2]. (This report is reprinted later in this issue.) These outbreaks have accounted for approximately 50% of all measles cases reported in the U.S. up to 1 July, 1994. The

overall proportion of measles cases attributed to unimmunized religious groups in Quebec is minimal.

Excluding those individuals not immunized because of religious or philosophical reasons, and despite a measles vaccine coverage of over 95% at 2 years of age, there appears to be still a relatively high number of susceptible individuals in Quebec[3]. In fact, 10 to 15% of individuals given the measles vaccine at 12 months (the age recommended in the immunization schedule) (De Serres et al, unpublished data) may be lacking adequate immunity[4]. Implementation of a two-dose measles immunization program, in conjunction with a catch-up strategy to reach the 18-month to 20-year-old cohort, would make it possible to reduce quickly the pool of susceptible individuals.

Acknowledgments

We wish to express our thanks to Mrs. Louise Marcotte and Mrs. Carla Sabini for their data processing support, Mr. Réal Viau, Information Officer, for his assistance in gathering information on the religious group, and the physicians, laboratory staff and school nurses involved in case reporting.

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1. LCDC. *Canadian communicable disease surveillance system: disease-specific case definitions and surveillance methods*. CDWR 1991;17S3:26.
2. CDC. *Outbreak of measles among Christian Science students - Missouri and Illinois, 1994*. MMWR 1994;43:463-65.
3. Landry M, Valiquette L, Allard R, Ciorti M. *Taux de couverture vaccinale et ses déterminants chez les enfants âgés de 24 à 30 mois habitant Laval et l'Est de Montréal*. Presented at the 3e colloque québecois sur les maladies infectieuses, Québec, November, 1992.
4. Rivest P, Bédard L, Arruda H et al. *Risk factors for measles and vaccine efficacy during an epidemic in Montreal*. Can J Public Health. In press.

Source: *L Valiquette, MD, L Bédard, MSc, MPH, and the professionals of the Infectious Diseases Unit, Public Health Department, Health and Social Services Board, Montreal Centre Region, Montreal, Quebec.*

Editorial Comment: Available information suggests that, among the reported cases of measles in recent years in Canada, the proportion linked to those who refuse measles vaccination for religious or philosophic reasons is generally small; the majority of cases do have a vaccination history. However, the above report proves that pockets of unvaccinated susceptible children exist in Canada. Occurrence of another cluster of cases involving such a population was reported in Alberta in 1994 (J. Waters, Alberta Health: personal communication, 1995).

In the past, outbreaks involving religious communities have been reported from Ontario and Alberta. For example, in 1986 the Niagara Area Regional Health Unit (Ontario) reported a measles outbreak in which 32/132 (24%) cases occurred in unimmunized individuals (religious/conscience exemptions)[1].

It is known that communities or groups that do not accept vaccination (for whatever reasons) can provide foci of infection that can result in further transmission. Expanding public awareness, especially within these specific communities, about the disease and vaccine safety is essential for effective measles prevention and for achieving elimination of measles in Canada.

Reference

1. Carter AO, Delmore T, Reed C et al. *Measles epidemic in Niagara - 1986-87*. ODSR 1987;8:365-69.

International Notes

OUTBREAK OF MEASLES AMONG CHRISTIAN SCIENCE STUDENTS — MISSOURI AND ILLINOIS, 1994

During 4 April to 17 May, 1994, the largest U.S. measles outbreak since 1992 occurred among students in two communities that do not routinely accept vaccination. This report summarizes the investigation of and control measures for this outbreak.

The outbreak began in a 14-year-old Christian Science high school student who developed a rash on 4 April, 2 weeks after skiing in Colorado where a measles outbreak was occurring. The student lived with her family in a community associated with a Christian Science college in Jersey County, Illinois, and commuted approximately 50 kilometres to a Christian Science boarding school (kindergarten through grade 12 [K-12]) in St. Louis County, Missouri. From 16 April through 19 May, 141 persons with measles (age range: 1 to 24 years) were reported to the St. Louis County Health Department, and 49 persons with measles (age range: 4 to 25 years) were reported to the Jersey County Health Department (Figure 1).

All cases met the measles clinical case definition[1] and were epidemiologically linked to the boarding school and/or college. Fourteen cases were serologically confirmed by detection of immunoglobulin M antibody. All cases occurred among persons not vaccinated before the outbreak. Eighteen prospective students from outside St. Louis County attended a carnival at the boarding school on 16 April; eight developed measles after returning home (three to Maine, two to California, and one each to Missouri, New York, and Washington). Two cases of serologically confirmed measles occurred in persons outside the Christian Science communities. One case occurred in an unvaccinated 35-year-old physician who attended a tennis tournament on 30 April where students from the affected college competed. The other case occurred in a 9-month-old infant who visited a restaurant on 30 April where the college tennis team was eating.

Control measures included offering measles vaccine to students in the affected communities and isolating persons with rashes and those considered susceptible to measles. On 19 April, the boarding school and college began isolating persons with rashes in a separate building on each campus placing 24-hour guards at campus entrances. Only persons with proof of immunity to measles were permitted to enter or leave the campuses. Isolation measures on both campuses remained in effect until 14 days after the appearance f rash in the last persons with measles for each school.

Students who did not live on campus and had no proof of vaccination were voluntarily isolated in their homes, unless they were born before 1957 or could provide documentation of 1)

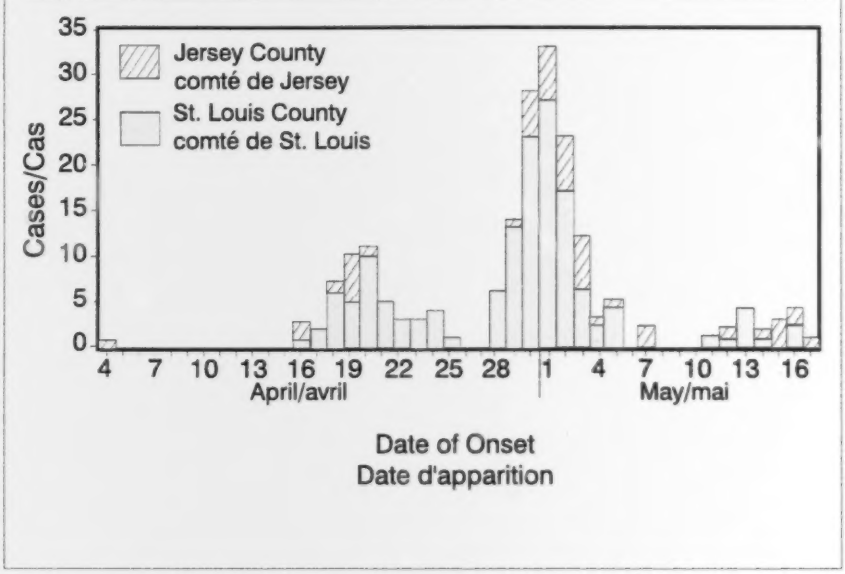
previous physician-diagnosed measles, 2) laboratory evidence of measles immunity, 3) two doses of measles vaccine at least 1 month apart on or after their first birthday, or 4) one dose of measles vaccine on or after 18 April, 1994.

Measles vaccination was offered to Christian Science students and persons in the surrounding communities at special clinics offered by the public health departments in both Missouri and Illinois. A total of 149 Christian Science students (K-12) and their siblings were vaccinated in Missouri and 451 in Illinois. Of the 149 students at the boarding school who received measles-mumps- rubella vaccine (MMR) during outbreak control, 61 (41%) developed measles within 2 weeks after vaccination.

Siblings of persons with measles who were enrolled in public schools in St. Louis County were voluntarily isolated at home. Active surveillance for persons with rashes was initiated in the county public schools on 9 May and consisted of a daily telephone call from the health department to the head nurse in each school district who monitored all student absentees for rash illness. A second dose of measles vaccine was administered to 675 students in vaccination clinics conducted in four public schools in St. Louis County and three public schools in the city of St. Louis where rash cases were detected. No outbreak-control vaccination was conducted in Illinois public schools because two doses of measles vaccine had been mandated for all K-12 schoolchildren since 1993, and compliance with this law was considered to be high.

As of 29 June, no additional measles cases had been reported among persons outside the Christian Science community in St. Louis County or elsewhere in Missouri or in Illinois. In response to the outbreak, St. Louis County will require two doses of measles vaccine for all schoolchildren by the start of the 1994-95 school year.

Figure 1
Number of measles cases, by date of rash onset and location — St. Louis County, Missouri, and Jersey County, Illinois, 4 April - 17 May, 1994



Reference

1. CDC. *Case definitions for public health surveillance*. MMWR 1990;39(no. RR-13):23.

Source: *Morbidity and Mortality Weekly Report, Vol 43, No 25, 1994.*

Notifiable Diseases Summary

We have excluded this table from the FAX issue of Canada Communicable Disease Report for those readers who do not need this information. For those readers interested in this table, call the FAX line and select the index to get the access number.

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